

REMARKS

Applicant requests reconsideration of the present application in view of the discussion that follows. The status of the claims is as follows. Claims 1-70 were originally filed. Claims 1-25 and Claims 71-97 are currently pending. Claims 26-70 were withdrawn from consideration and these claims were canceled previously without prejudice to Applicant's filing of divisional applications to what has been determined in a previous Office Action to be the separately patentable subject matter thereof. Claims 1, 3, 5, 17-18, 20, 71, 75-77, 80-86 and 89-91 have been amended herein and Claim 98 has been added. Claims 6-11, 13-16, 19 and 25 have been canceled herein.

The Amendment

Claim 1 was amended to incorporate the elements of Claim 20 and to delete dimensions of the support and to delete alternative (b) directed to a ledge. Claim 1 was also amended to recite that the at least one wall extends upwardly from a top edge of the well to a top portion of the housing. Support therefor is in the Specification, for example, Fig. 1.

Claim 3 was amended to recite that the support has dimensions of about 0.5 inches to about 1.5 inches by about 0.5 inches to about 1.5 inches or by about 2.0 inches to about 4.0 inches with a thickness of about 0.030 to about 0.05 inches, which dimensions were deleted from Claim 1.

Claims 5, 17 and 18 were amended to change their respective dependencies from Claim 3 to Claim 1.

Claim 20 was amended to recite that the plurality of biopolymers are in the form of an array. Support therefor is in the Specification, for example, page 18, lines 8-12.

Claim 71 was amended to recite that a surface of the support comprises an array of biopolymers. Support therefor is in the Specification, for example, page 18, lines 8-12. Claim 71 was also amended to delete part (a).

Claim 75 was amended to recite that the at least one wall is at least partially sloped at about 15 to about 60 degrees. Support therefor is in the Specification, for example, page 13, line 10.

Claims 76-77 and 80-81 were amended to change their respective dependencies.

Claim 82 was amended to change its dependency and to recite that the at least one wall is a circular wall extending from the ledge to a top portion of the device. Support therefor is in the Specification, for example, Figs. 3 and 4.

Claims 83-86 were amended to satisfy their respective dependencies from Claim 71.

Claim 89 was amended to change its dependency.

Claim 90 was amended to recite that the biopolymers are polynucleotides. Support therefor is in the Specification, for example, page 18, lines 8-12.

Claim 91 was amended to recite that the polynucleotides are DNA. Support therefor is in the Specification, for example, page 18, lines 8-12.

Claim 98 was added and finds support in the Specification, for example, page 13, line 10.

Rejections under 35 U.S.C. §103

Claims 1-25 were rejected under 35 U.S.C. 103(a) as being unpatentable over Earley, *et al.* (WO 94/08759 A1) (Earley).

With regard to Claim 1, Earley does not disclose or suggest at least one wall, in addition to the walls of the well of the present devices, extending upwardly from a top edge of the well to the top of the housing wherein the at least one wall is at least partially sloped in an area thereof adjacent the well. As indicated on page 7, lines 10-11, and Figs. 7-8, Earley's disclosure relates only to standard ninety six well microtiter plates. As can be seen from Fig. 8, the wells of Earley's microtiter plate do not have, nor is there any suggestion of, at least one wall extending upwardly from a top edge of the well to the top of the housing wherein the at least one wall is at least partially sloped in an area thereof adjacent the well. As a matter of fact, Earley's teaching is completely devoid of any disclosure of additional walls leading from his well.

The Office Action responds to Applicant's argument with the contention that Earley teaches a microtiter plate with a lid or cover. When a standard microtiter plate cover is placed on the plate, continues the Office Action, it fits snugly over the plate such that the area adjacent a top edge of the wells on the periphery of the microtiter plate meets/contacts the microtiter plate cover (top portion of the housing). Therefore, concluded the Office Action, the area adjacent the top edge of the wells on the periphery of the microtiter plate contacts the microtiter plate cover or the top

of the housing, and the wall is at least partially sloped in that it is vertical in contacting the cover.

Applicant respectfully disagrees with the above comments in the Office Action with regard to the present claims. Claim 1 now recites that the at least one wall, which is in addition to the walls of the well, extends upwardly from a top edge of the well to a top portion of the housing. Clearly, adjacent wells of the microtiter plate do not satisfy this limitation. Earley does not disclose or suggest at least one wall extending upwardly from a top edge of the well to the top of the housing wherein the at least one wall is at least partially sloped in an area thereof adjacent the well.

The Advisory Action asserts that the structure of microtiter plate covers is a horizontal top portion with walls extending down from this top portion to fit the grooves on the microtiter plate. However, Earley does not disclose or suggest any additional features such as walls on the cover that extend into the wells. No evidence of such additional features has been made of record either by disclosure in a reference or by an Examiner's Affidavit.

Furthermore, even if one were to assume for the sake of argument that such features were disclosed in the reference, Applicant submits that such additional features do not satisfy the claim limitation of a wall(s), in addition to the walls of the wells, where the wall extends upwardly from a top edge of the well and is at least partially sloped in an area thereof adjacent the well. As best that Applicant can understand without the benefit of any disclosure in a reference or any affidavit from the Examiner, such proposed features of a cover would extend downwardly into the well from an area adjacent a top edge of the well. Accordingly, such an imagined structure would not meet the claim limitation of extending upwardly from a top edge of the well. In any event, as mentioned above, the point is moot since Earley does not disclose or suggest any additional features on the cover that extend into the wells. It is also noteworthy that Daniel, *infra*, and Kwasnoski, *infra*, both of which references actually provide drawings showing covers for a microtiter plate, do not disclose any additional features that extend from the cover into the wells of the microtiter plate.

Another point is that it has long been held that discovery of a problem is one consideration in determining the patentability of a claimed invention. *In re Atkinson*, 102 F.2d 882, 41 USPQ 308 (C.C.P.A. 1939); *In re Nomiya*, 509 F.2d 566, 184 USPQ 607 (C.C.P.A. 1969) As Applicant indicated in the Specification (page 26,

lines 19-25, and paragraph bridging pages 23 and 24), for reactions involving biopolymers particularly in the form of an array of biopolymers, a small quantity of sample is distributed over the surface of the support to which the biopolymers are attached. Also, during reactions involving biopolymers on a support surface, it is often desired to heat the materials in contact with the surface of a support in a well. The heating of the support should be carried out in a manner that minimizes or avoids loss of liquid in the well of the device. This is particularly true where the liquid is sample, which is present in a relatively small quantity. Loss of liquid may occur by evaporation out of the device, by evaporation and condensation on the surface of the device, by wicking out of the well of the device and so forth. As one might appreciate, loss of even small quantities of the sample can be detrimental to the accuracy of an assay and can also result in waste of sample, which is already in limited quantity.

As the Office Action appreciates, the wicking problem recognized by Applicant is contrary to the expectations of one skilled in the art. The Office Action indicates that one does not put liquid in wells of a microtiter plate with the expectation that the liquid will not remain in there. Rather, continues the Office Action, one expects that liquid disposed in the well will stay there. On the contrary, Applicant has discovered that, in situations where a small volume of liquid forms a thin layer above the surface of a substrate or support, which comprises a plurality or an array of biopolymers, wicking of liquid from the well may occur. The structural features of the devices of the present invention avoid such wicking.

It is Applicant's teaching and invention to avoid wicking by various structural features of the claimed devices. Accordingly, the holding in *In re Rose* is not applicable since the present invention goes far beyond mere differences in size of an article of manufacture. The references do not teach or suggest the structural features set forth in the claims, nor do the references teach the problem solved by the present invention.

Earley does not disclose or suggest the device of Claim 2 wherein the at least one wall is designed such that the corners thereof are radiused. There is no disclosure in Earley regarding such a device.

For the reasons set forth above, Earley does not disclose or suggest the device of Claim 3 wherein the at least one wall is at least partially sloped in an area thereof adjacent the well.

For the reasons set forth above, Earley does not disclose or suggest the device of Claim 5 wherein the at least one wall is sloped from the edge of the well to a top portion of the housing.

Earley does not disclose or suggest the device of Claim 12 wherein the at least one wall is a circular wall extending from the edge of the well to a top portion of the device.

Earley does not disclose or suggest the device of Claim 17 wherein the partially sloped wall is sloped at least about 35 degrees.

Earley does not disclose or suggest the device of Claim 18 wherein the at least partially sloped wall is sloped at about 30 to about 55 degrees.

As mentioned above, Earley does not disclose or suggest the device of Claim 20 wherein a surface of the support comprises an array of biopolymers or wherein the biopolymers are polynucleotides (Claim 21).

Earley does not disclose or suggest the device of Claim 22 wherein the slope of the partially sloped wall is constant.

Earley does not disclose or suggest the device of Claim 23 wherein the slope of the partially sloped wall is not constant.

Earley does not disclose or suggest the device of Claim 24 wherein the device comprises a single well and a cover. If, as asserted in the Office Action, the cover on the microtiter plate of Earley is the top of the housing, then the device of Earley would not further comprise a cover and, in particular, a cover on a single well.

The Office Action further contends that it would have been obvious to use a rectangular ledge for the plate as opposed to a circular one as such a modification is a simple optimization of the assay device and is not thought to change the device in any substantial manner. However, as can be seen from Fig. 8, the wells of Earley's microtiter plate do not have, nor is there any suggestion of, a ledge that extends from the edge of the well to the at least one wall (see Claim 71, for example). As a matter of fact, Earley's teaching is completely devoid of any disclosure of additional walls leading from his well and of a ledge that extends from the edge of the well to such a wall(s). In the Advisory Action, the Examiner indicated agreement that the references do not show a ledge as recited in the claims.

Accordingly, Earley does not disclose or suggest a device as claimed in Claim 71, and claims dependent thereon, which are directed to a device with a ledge extending from the edge of the well to the at least one wall that is in addition to the

walls of the well. As mentioned above, the Advisory Action agreed with the fact that this reference does not show such an element.

Earley does not disclose or suggest the device of Claim 78 wherein the at least one wall comprises a partially sloped portion in an area adjacent the ledge and a vertical portion extending from the partially sloped portion to a top portion of the device.

Earley does not disclose or suggest the device of Claim 79 wherein the at least one wall is fully sloped from the ledge to a top portion of the housing.

As discussed above, Earley does not disclose or suggest the device of Claim 80 wherein the ledge is rectangular in shape about the well.

Earley does not disclose or suggest the device of Claim 81 wherein the ledge is circular in shape about the well.

Earley does not disclose or suggest the device of Claim 83 wherein the at least one wall is a circular wall extending from a ledge adjacent the edge of the well to a top portion of the device.

Earley does not disclose or suggest the device of Claim 84 wherein the device comprises at least two walls that are fully sloped from a ledge adjacent the edge of the well to a top portion of the device.

Earley does not disclose or suggest the device of Claim 85 wherein the device comprises two opposing walls that are fully sloped from a ledge adjacent the edge of the well to the top portion of the device and two opposing walls extending vertically from the ledge to the top portion.

Earley does not disclose or suggest the device of Claim 86 wherein the device comprises four walls that are fully sloped from a ledge adjacent the edge of the well to the top portion of the device.

Earley does not disclose or suggest the device of Claim 89 wherein the ledge comprises a polished surface that prevents wicking of a liquid along the ledge.

Earley does not disclose or suggest the device of Claim 96 wherein the at least one wall is designed such that any corners thereof are distant from the edge of the well by about 0.1 inch to about 1 inch.

The Advisory Action indicated that the above arguments regarding the dependent claims seemed to rely on the premise that the independent claims are not properly rejected as applicant simply stated the the references do not teach the limitations of the dependent claims without providing any rationale. Applicant

respectfully points out that the burden is on the Office to show that the claims are anticipated by or obvious in view of a reference. In each instance, Applicant is demonstrating that the reference is deficient in not teaching the elements of the dependent claims as discussed above. As such, the claims are not properly rejected over the reference. Neither the Office Action nor the Advisory Action has shown such elements in the teaching of the reference.

For example, the Advisory Action relies on an imagined cover with depending features or walls for extending into the well. The Advisory Action furthermore states that the walls of the microtiter plate cover that extend down to contact the microtiter plate are never perfectly vertical and the smallest deviation from the vertical would be sufficient to qualify as sloped. As pointed out above, there is no reference or Examiner's Affidavit to support a teaching of such a cover. However, even if for the sake of argument one were to accept the existence of such a microtiter plate cover with alleged non-vertical appendages, Claim 17 recites that the partially sloped wall is sloped at least about 35 degrees and Claim 18 recites that the at least partially sloped wall is sloped at about 30 to about 55 degrees and Claim 98 recites that the at least partially sloped wall is sloped at about 15 to about 60 degrees. There is no disclosure of record relating to the recited degree of sloping. Since there is no such disclosure, dependent Claims 17, 18 and 98 are patentable over the art. This is an example of the rationale behind Applicant's pointing out that the reference does not disclose certain features of certain dependent claims. Even if one were to assume for the sake of argument that the independent claims were properly rejected, such dependent claims would be patentable over the art because they are directed to elements not disclosed or suggested in the references cited or in the imagined cover with depending features that extend into the well of a microtiter plate.

A further point is that, when a lid is placed over the known microtiter plate, one merely has a lid on top of the housing of the microtiter plate. The lid does not become part of the microtiter plate housing. The Advisory Action responds to this assertion by stating that, when a lid is placed over the microtiter plate, given its broadest interpretation, the whole structure may be viewed as the housing. The problem with such an assertion is that, if a cover placed on a microtiter plate becomes part of the housing, then, there is no well. Rather, one has an enclosed chamber. In addition, if the cover on the microtiter plate of Earley were part of the

housing, then the device of Earley would not further comprise a cover as in Claim 24. However, this claim was rejected over the reference.

Claims 1-25, 71-91 and 93-97 were newly rejected under 35 U.S.C. 103(a) as being unpatentable over Pedley (GB 2 197 720 A) in view of Kwasnoski, *et al.* (U.S. Patent No. 6,423,948 B1) (Kwasnoski). The disclosure of Pedley is discussed in a previous response. Kwasnoski discloses a microtiter plate system that in some embodiments includes a lid with an integral heater.

Pedley does not disclose or suggest at least one wall in addition to the wall(s) of the well, extending upwardly from a top edge of the well to the top of the housing wherein the at least one wall is at least partially sloped in an area thereof adjacent the well (Claim 1) or wherein a ledge extends from the edge to the at least one wall (Claim 71). Pedley's teaching is completely devoid of any disclosure of additional walls leading from his well to the top of his housing. Pedley's teaching is also devoid of any teaching regarding a ledge extending from the edge of a well to the at least one wall. As mentioned above, the Advisory Action agrees that the references do not teach this latter embodiment.

The Office Action asserts that it would have been obvious to one of ordinary skill in the art at the time of the invention to use the cover of Kwasnoski with the microtiter plate of Pedley because covers are routinely used in the art on microtiter plates to prevent loss of sample or contamination. Even if for the sake of argument one skilled in the art were motivated to make the combination of reference teachings as imagined in the Office Action, the skilled artisan would still not be in possession of the presently claimed inventions. As discussed above, Claim 1 recites that the well has walls and furthermore the housing has at least one wall that extends upwardly from a top edge of the well to the top of the housing wherein the at least one wall is at least partially sloped in an area thereof adjacent the well.

As discussed above, the Advisory Action asserts that the structure of microtiter plate covers is a horizontal top portion with walls extending down from this top portion to fit the grooves on the microtiter plate. As with the Earley reference, Kwasnoski does not disclose or suggest any additional features such as walls on the cover that extend into the wells. See, for example, Fig. 6 of Kwasnoski, which shows a cover but does not depict any additional features that extend from the cover into the wells of the microtiter plate.

As mentioned above, no evidence of such additional features has been made of record either by disclosure in a reference or by an Examiner's Affidavit. Even if one were to assume for the sake of argument that such features were disclosed in the reference, Applicant submits that such additional features do not satisfy the claim limitation of a wall(s), in addition to the walls of the wells, where the wall extends upwardly from a top edge of the well and is at least partially sloped in an area thereof adjacent the well. As best that Applicant can understand without the benefit of any disclosure in a reference or any affidavit from the Examiner, such proposed features of a cover would extend downwardly into the well from an area adjacent a top edge of the well. In any event, as mentioned above, the point is moot since Kwasnoski does not disclose or suggest any additional features on the cover that extend into the wells.

For the reasons set forth above with regard to the rejection over Earley, each of the dependent claims as identified above is separately patentable over the combination of Pedley and Kwasnoski. The combination of the reference teachings does not disclose or suggest the claimed elements of the dependent claims and these claims are patentable over the references without regard for the patentability of the base claims, which, nonetheless, are patentable over the art as explained above.

Claims 1-25, 71-91 and 93-97 were newly rejected under 35 U.S.C. 103(a) as being unpatentable over Balch (U.S. Patent No. 6,083,763) in view of Kwasnoski. The reasoning behind the rejection in the Office Action is essentially as discussed above for the rejection under Earley and under Pedley in view of Kwasnoski. For the reasons set forth above, Claims 1, and each of the dependent claims as identified above, as well as Claim 71, and those claims dependent therefrom, are separately patentable over the combination of Balch and Kwasnoski.

Claims 1-19, 22-25, 71-89 and 93-97 were newly rejected under 35 U.S.C. 103(a) as being unpatentable over Daniel (U.S. Patent No. 4,919,894). The reasoning behind the rejection in the Office Action is essentially as discussed above for the rejection under Earley. For the reasons set forth above, Claims 1, and each of the dependent claims as identified above, as well as Claim 71, and those claims dependent therefrom, are separately patentable over Daniel.

Claims 1-19, 22-25, 71-89 and 93-97 were newly rejected under 35 U.S.C. 103(a) as being unpatentable over Matkovich, *et al.* (U.S. Patent No. 4,828,386) (Matkovich) in view of Kwasnoski. The reasoning behind the rejection in the Office

Action is essentially as discussed above for the rejection under Earley and under Pedley in view of Kwasnoski. For the reasons set forth above, Claims 1, and each of the dependent claims as identified above, as well as Claim 71, and those claims dependent therefrom, are separately patentable over the combination of Matkovich and Kwasnoski.

Claims 1-19, 22-25, 71-89 and 93-97 were newly rejected under 35 U.S.C. 103(a) as being unpatentable over Calenoff, *et al.* (U.S. Patent No. 4,844,966) in view of Kwasnoski. The reasoning behind the rejection in the Office Action is essentially as discussed above for the rejection under Earley and under Pedley in view of Kwasnoski. For the reasons set forth above, Claims 1, and each of the dependent claims as identified above, as well as Claim 71, and those claims dependent therefrom, are separately patentable over the combination of Calenoff and Kwasnoski.

Claims 1-19, 22-25, 71-89 and 93-97 were newly rejected under 35 U.S.C. 103(a) as being unpatentable over Provonchee (U.S. Patent No. 4,701,754) in view of Kwasnoski. The reasoning behind the rejection in the Office Action is essentially as discussed above for the rejection under Earley and under Pedley in view of Kwasnoski. For the reasons set forth above, Claims 1, and each of the dependent claims as identified above, as well as Claim 71, and those claims dependent therefrom, are separately patentable over the combination of Provonchee and Kwasnoski.

Claims 1-19, 22-25, 71-89 and 93-97 were newly rejected under 35 U.S.C. 103(a) as being unpatentable over Cassin, *et al.* (U.S. Patent No. 5,910,287)(Cassin). Cassin does not disclose or suggest a device having well(s) with wall(s) and a housing with at least one wall extending upwardly from a top edge of the well to the top of a housing wherein the at least one wall is at least partially sloped in an area thereof adjacent the well or wherein a ledge extends from the edge to the at least one wall. Cassin's teaching is completely devoid of any disclosure of additional walls leading from his well.

The Office Action contends that the walls of the wells of Cassin's microtiter plate may be completely vertical or may be conical. Even if for the sake of argument such a teaching were found in Cassin, one skilled in the art would still not be in possession of the presently claimed inventions. In Claim 1, the devices comprise a well having walls and a housing comprising at least one wall extending upwardly

from a top edge of the well to a top portion of the housing, wherein the at least one wall is at least partially sloped in an area thereof adjacent the well. The cross-sectional shape of Cassin's wells or the alleged fact that the walls of Cassin's wells may be completely vertical or may be conical has no informative value to the "at least one wall" of the claim language because the "at least one wall" is in addition to the walls of the wells. It is this "at least one wall" that extends upwardly from a top edge of the well to the top of the housing and is at least partially sloped in an area thereof adjacent the well. For the reasons set forth above, Claims 1, and each of the dependent claims as identified above, as well as Claim 71, and those claims dependent therefrom, are separately patentable over the teaching of Cassin.

Claims 1-20, 22-25, 71-90 and 92-97 were newly rejected under 35 U.S.C. 103(a) as being unpatentable over Kaufman, *et al.* (U.S. Patent No. 4,596,723) (Kaufman) in view of Kwasnoski. The Office Action contends that Kaufman discloses an immunoassay wherein antigen solutions are allowed to stand overnight in wells of polystyrene or polypropylene microtiter plates permitting adsorption of protein to the well bottom and walls. The Office Action further contends that it would have been obvious to one of ordinary skill in the art at the time of the invention to use the cover of Kwasnoski with the microtiter plate of Kaufman because covers are routinely used in the art on microtiter plates to prevent loss of sample or contamination.

The reasoning behind the above rejection in the Office Action is essentially as discussed above for the rejection under Earley and under Pedley in view of Kwasnoski. For the reasons set forth above, Claims 1, and each of the dependent claims as identified above, as well as Claim 71, and those claims dependent therefrom, are separately patentable over the combination of Kaufman and Kwasnoski.

Summary

Most of the above references disclose or suggest nothing more than conventional multi-well microtiter plates. Some references disclose various nuances of the conventional microtiter plates but do not disclose or suggest the structural features of the devices of the present invention as discussed above with regard to each reference. None of the references discloses or suggests the problem solved by the present invention. Applicant submits that, in order for one to modify the deficient teachings of the reference to achieve the devices of the present invention, one would

have to use Applicant's disclosure because the references do not teach anything relevant to the wicking problem addressed by Applicant and the structural features that avoid this problem particularly as they relate to supports comprising a plurality or array of biopolymers.

The fact that a cover might be used with a microtiter plate does not disclose or suggest the inventions of the present claims as explained above. Claim 1 recites that the device comprises a housing and a support in a well of the housing where the support comprises a plurality of biopolymers. The well has walls and the housing comprises at least one wall that extends upwardly from a top edge of the well to the top of the housing wherein the at least one wall is at least partially sloped in an area thereof adjacent the well.

As discussed above, the Advisory Action asserts that the structure of microtiter plate covers is a horizontal top portion with walls extending down from this top portion to fit the grooves on the microtiter plate. No evidence of such additional features has been made of record either by disclosure in a reference or by an Examiner's Affidavit. As a matter of fact, those references cited in the Office Action that do show drawings of a cover do not depict any such features as proposed in the Advisory Action. In addition, even if one were to assume for the sake of argument that such features were disclosed in the reference, Applicant submits that such additional features do not satisfy the claim limitation of a wall(s), in addition to the walls of the wells, where the wall extends upwardly from a top edge of the well and is at least partially sloped in an area thereof adjacent the well. Such proposed features of a cover would extend downwardly into the well from an area adjacent a top edge of the well. In any event, as mentioned above, none of the references discloses or suggests any additional features on the cover that extend into the wells.

The Advisory Action indicates that none of the references show or suggest a ledge extending from the edge to the at least one wall such as recited in Claim 71. Claim 71 and those claims depending therefrom are patentable over the art. Furthermore, some of the claims depending from Claim 71 are patentable over the art apart from the patentability of Claim 71.

The issue of a declaration by Applicant was raised in the Office Action and in the Advisory Action. Applicant submits that the independent and dependent claims comprise structural features that are not disclosed or suggested by the references. Accordingly, Applicant believes that such a declaration is not warranted because the

Office Action has not met its burden of proof that the inventions as claimed in the independent and dependent claims are rendered obvious by the disclosures of the references.

Conclusion

Claims 1-5, 12, 17-18, 20-24 and 71-98 satisfy the requirements of 35 U.S.C. §103. Allowance of the above-identified patent application, it is submitted, is in order.

Respectfully submitted,



Theodore J. Leitereg
Attorney for Applicant
Reg. No. 28,319

Agilent Technologies, Inc.
Legal Department, M/S DL429
Intellectual Property Administration
P.O. Box 7599
Loveland, CO 80537-0599